

**United States Patent** [19]  
**Hall**

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[54] **GRENADE FUSE LEVER**

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[58] Field of Search..... **102/8, 64**

[56] **References Cited**

UNITED STATES PATENTS

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FOREIGN PATENTS OR APPLICATIONS

354,193 11/1937 Italy ..... 102/64

Primary Examiner—Verlin R. Pendegras

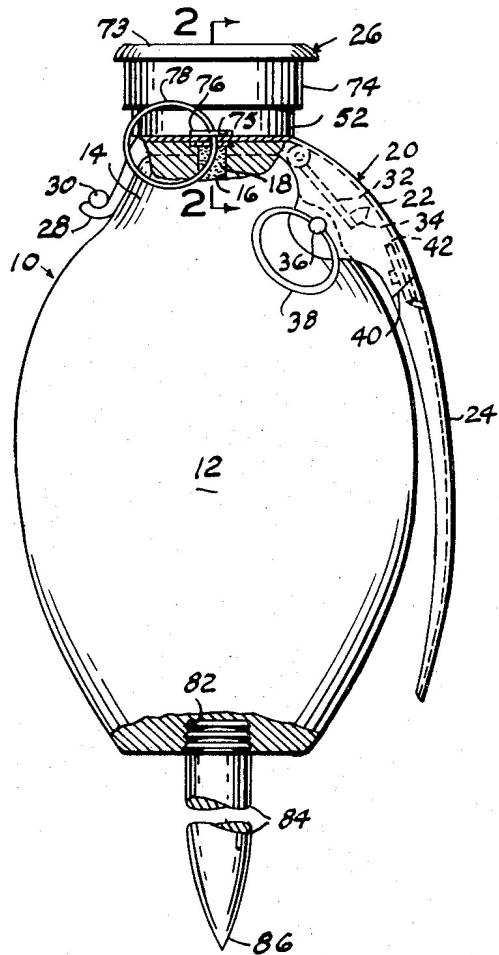
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[57]

**ABSTRACT**

A hand grenade having an explosive filled projectile body is provided with a handle spring urged away from the body by a spring urged firing pin with the handle normally retained on the body by a safety pin. The handle is provided with a head portion containing a pressure sensitive firing or striker pin normally rendered inoperative by a safety bar.

**6 Claims, 6 Drawing Figures**



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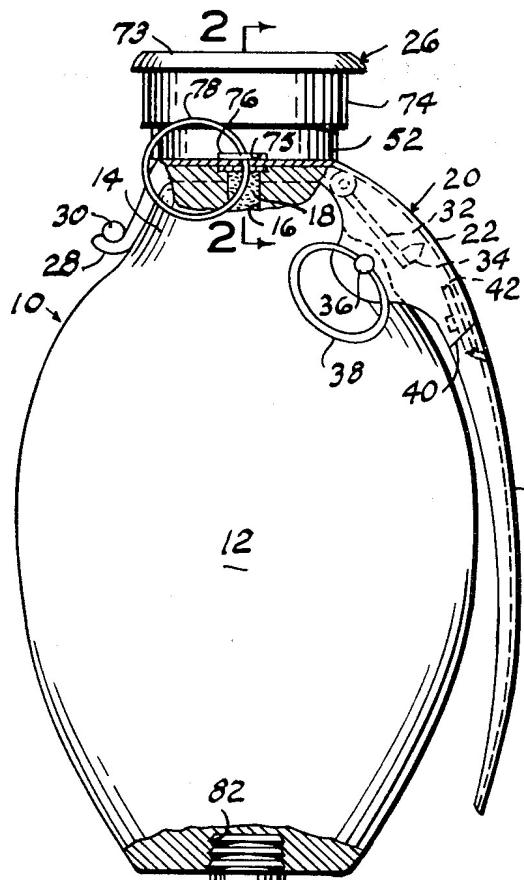
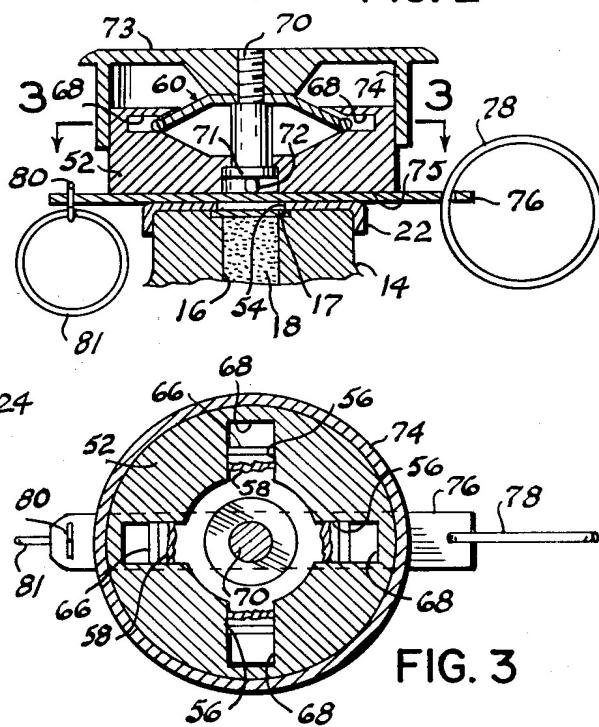


FIG. 1



**GRENADE FUSE LEVER****BACKGROUND OF THE INVENTION****1. Field of the invention**

The present invention relates to hand grenades and more particularly to a dual purpose hand grenade fuse lever permitting use of the grenade in a conventional manner and as a land mine or booby-trap.

**2. Description of the prior art**

Grenade fuse devices have usually comprised a handle member pivotally secured at one end portion across one end of the explosive containing projectile body having a percussion sensitive primer therein which, when struck by a firing pin, initiates the firing sequence of the grenade fuse resulting in detonation of the explosive material contained by the grenade body. The handle is usually maintained in place and the grenade inoperative by a safety pin securing the handle to the grenade. When the safety pin is pulled, while manually holding the free end of the handle adjacent the grenade body, the grenade is thrown and the handle is pivoted away from the grenade body by a spring urged firing pin assisted by air resistance against the handle.

U.S. Pat. Nos. 2,412,636; 2,941,471 and 3,049,999 are illustrative of the above described fuse lever operation.

The fuse lever of this invention, in one embodiment, functions in the above more or less conventional manner. Another feature of my dual purpose fuse lever resides in a head portion attached to the fuse lever in overlying relation with respect to the percussion sensitive primer of the grenade with the head portion containing a second firing or striker pin coaxial with the primer, wherein this second firing or striker pin is forced into the primer in response to the collapse of a pressure sensitive spring having a predetermined magnitude of pressure applied thereto. The striker pin is normally maintained inoperative by a safety bar extending transversely through the lever head portion.

Spring urged firing pins coaxial with the grenade primer are disclosed by U.S. Pat. Nos. 2,437,001; 3,194,161 and 3,554,127 in which these coaxial firing pins are released for striking the primer only after the handle or grenade body enclosing half-shells are pivoted away from the grenade body, after pulling the safety pin and throwing the grenade, whereas my fuse lever head portion contained coaxial striker pin is cocked or rendered operative by pulling the safety bar so that the striker pin may be activated by the collapse of its spring support in response to a pressure of predetermined magnitude applied to the surface of the handle head portion opposite the grenade. This permits a substantially conventional grenade equipped with my dual purpose handle to function as a land mine.

**SUMMARY OF THE INVENTION**

This dual purpose grenade fuse lever is releasably connected at one end portion with projections formed on a conventional grenade explosive containing body with an intermediate portion of the lever overlying the percussion sensitive primer end of the grenade body and the other end portion extending longitudinally toward the other end of the body. A conventional safety pin maintains the lever in place with the grenade spring urged firing pin interposed between the handle and the grenade body for release of the handle by the spring urged firing pin after the safety pin is removed and the

grenade thrown. This fuse lever is provided with an opening coaxial with the grenade fuse primer with a telescoping head portion coaxially attached thereto and surrounding the handle opening. The head portion contains a pressure sensitive collapsible spring supporting a head striker pin coaxial with the handle opening and fuse primer. A head safety bar extends transversely through the head portion so that the head striker pin may be "armed" by removal of the head safety bar permitting the grenade to be implanted and function as a land mine. Intermediate its ends the lever is divided for removal of its free end portion which permits the grenade to be used as a booby-trap and fired by a trip-lanyard removing the conventional safety pin wherein the remaining portion of the handle, attached to the grenade, offers little or no resistance to the spring urged action of the conventional firing pin.

The principal object of this invention is to provide a dual purpose fuse lever for substantially conventional ignition and detonating grenade fuse permitting the grenade to be used in a conventional manner or as a land mine by pressure detonation or for lanyard tripped booby-trap purposes.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a side elevational view of a grenade having the lever installed thereon with portions of the grenade broken away for clarity;

FIG. 2 is a fragmentary vertical cross-sectional view, to a larger scale, taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a horizontal sectional view taken substantially along the line 3—3 of FIG. 2;

FIG. 4 is a perspective view of the pressure sensitive slam action striker pin supporting spring and illustrating, by dotted lines, its collapsed position with the magnitude of movement exaggerated for clarity;

FIG. 5 is a fragmentary perspective view, of a portion of the lever, to a further enlarged scale, with parts broken away for clarity illustrating the manner of connecting the removable handle end portion to the grenade attached portion of the handle; and,

FIG. 6 is a fragmentary vertical cross-sectional view taken substantially along the line 6—6 of FIG. 5.

**DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 10 indicates a substantially conventional hand grenade having a body 12 filled with an explosive material, not shown. The body 12 is provided with a head end portion 14 having an axial opening 16, normally sealed by a thin frangible disk 17, containing a primer 18 communicating with time delay means and a detonator, not shown, which forms the grenade fuse.

The reference numeral 20 indicates the dual purpose handle, as a whole, comprising a handle head portion 22 and a removable handle end portion 24 and further including a collapsible head portion 26. The handle head portion 22 overlies the grenade head 14 and is provided at one end portion with hook-shaped members 28, only one being shown, which engages a projection 30 formed on the grenade head for retaining one end of the handle head portion on the grenade body.

The grenade head portion 14 is also provided with a spring urged lever 32 having a firing pin 34 secured to its free end which is normally maintained in a "cocked" position by the handle portion 22 overlying the lever and firing pin wherein the handle portion 22, opposite the hook members 28, is releasably secured to the grenade body by a primary safety pin 36, having a pull ring 38 connected with one end thereof.

The removable handle end portion 24 is manually separable from the handle head portion 22 along the line 40. The handle end portion 24 is normally maintained attached to the handle head portion 22 by a T-shaped tongue 42 having its stem portion 44 interposed between a pair of lugs 46 secured in opposing relation to the inner surface of the handle head portion 22 wherein the head portion 48 of the tongue engages the lugs 46 and prevents longitudinal movement of the handle end portion 24 away from the handle head portion 22. A cross bar 50, extending between and secured to the respective opposing inner surfaces of the head portion 22, below the tongue shaft 44, as viewed in FIG. 5, forms a fulcrum point for the tongue 42 when the handle end portion 24 is biased toward the grenade body 12 by a user grasping the handle and grenade body. The handle end portion 24 is removed from the handle head portion 22 by manually pivoting the handle end portion 24 away from the body 12 while the safety pin 36 is in place so that the head portion 48 of the tongue and its shaft 44 is released from engagement with the lugs 46 and may be manually pulled longitudinally out of the handle head portion in a sliding action over the cross bar 50.

The collapsible head portion 26 comprises a centrally drilled body 52 which is secured to the handle head portion 22 coaxial with the primer bore 16. The handle head portion 22 is provided with an opening 54 coaxial with the primer bore 16. The head body 52 is provided with a plurality, four in the example shown, of radial grooves or slots 56 open to the upper surface of the body 52 for respectively receiving a like plurality of legs 58 of a collapsible spring element 60. The spring element 60 comprises a central disk-like portion 62, having a central aperture 64, to which the legs are radially attached in downwardly diverging relation, as viewed in FIG. 4. The free end of each of the legs 58 is provided with an arcuate or rolled end edge surface 66 which is slidably received respectively by horizontal sockets 68 communicating with the respective leg receiving groove 56. The spring member 60 is preferably formed of metallic material having a resilience for resisting a pressure of predetermined magnitude which, if exceeded, collapses the spring 60, to its dotted line position of FIG. 4, in a snap or slam action for the purposes presently described.

The spring aperture 64 surrounds one end portion of a head striker pin 70 with the other end of the striker pin coaxially received by the bore of the head body and aligned with the handle head portion opening 54.

The depending end portion of the striker pin 70, a viewed in the drawings, is provided with a circumferential shoulder or flange 71 coaxially received by a downwardly open counterbore formed in the head body 52 to prevent upward movement of the striker pin 70. The depending end of the striker pin 70 terminates in a coaxial nipple or prong 72 for rupturing the disk 17 and igniting the primer material 18 as hereinafter explained.

A pressure plate 73 coaxially overlies the head body 52 and is centrally bored for threaded engagement with the upwardly disposed end portion of the striker pin 70. A sleeve 74 is attached at one end to the depending surface of the pressure plate 73 with its other end portion slidably receiving, in telescoping relation, the upper end portion of the head body 52. The head body 52 is provided at its depending end with a diametric slot 75 for receiving a head safety bar 76 having a bar pull ring 78 attached to one end and a cotter pin 80, or the like, inserted through the other end portion to prevent accidental removal of the head safety bar. A cotter pin pull ring 81 is attached to the eye of the cotter pin 80 to facilitate its removal.

10 The projectile body 12 is preferably provided with a threaded socket 82, in its depending end as viewed in FIG. 1, for receiving an elongated stake 84 having threads at one end for engagement with the threaded socket 82 and having its opposite end sharpened, as at 20 86, for the purposes presently explained.

#### OPERATION

In operation the handle 20 and its head portion 26 is mounted on and connected with the grenade with the conventional firing pin 34 retained in cocked position 25 by the handle and safety pin 36 as described hereinabove. When using the handle 20 and the grenade, in a conventional manner, the handle end portion 24 is manually grasped and gripped with the grenade, in a conventional manner, permitting the safety pin 36 to be removed and the grenade thrown so that the spring urged firing pin 34 pivots the handle away from the grenade, assisted by air resistance, thus permitting the firing pin 34 to strike the primer and in turn detonate the explosive.

When the handle and grenade is used as a land mine, the handle end portion 24 is removed, the safety pin 36 remains in place and the grenade is positioned below the surface of the earth with the handle head portion 26 disposed upwardly. The head safety bar 76 is removed for "arming" the grenade. Thereafter, a pressure of predetermined magnitude applied to the pressure plate 73 collapses the spring 60 thus forcing the head striker pin 70 toward and into the primer by rupturing the primer protective plate 17 and igniting the fuse.

When it is desired to use the grenade and attached handle as a booby-trap, the stake 84 is connected with the threaded socket 82 and the stake forced into the surface of the earth, not shown, and, if desired, at least a portion of the grenade may be similarly disposed below the surface of the earth. When used in this manner the handle end portion 24 is preferably removed and a lanyard, not shown, is connected with the safety pin pull ring 38 and connected at its other end to a suitable support or fixed object so that when the lanyard is encountered, intermediate its ends, the safety pin 36 is pulled permitting the spring urged firing pin 34 to pivot the handle portion 22 off the grenade thus igniting the primer 18.

Obviously the invention is susceptible to changes or alterations without defeating its practicability, therefore, I do not wish to be confined to the preferred embodiment shown in the drawings and described herein.

I claim:

1. In combination with a grenade having an explosive filled casing provided with a fuse including a primer in

communication with a detonator rendered operative, to ignite the explosive, by a spring urged firing pin, the improvement comprising:

a throw-off handle removably secured to said casing including a handle head portion overlying the primer; and,  
 a pressure sensitive striker means secured to said handle head portion opposite said primer,  
 said striker means including, an axially bored body coaxial with said primer,  
 the head portion of said handle having an opening providing communication between said primer and the axial bore of said body,  
 a sleeve telescopically receiving the end portion of said body opposite said handle head portion,  
 a pressure plate overlying the end of said sleeve opposite said body,  
 snap action resilient means supported by said body,  
 a striker pin slidably received, coaxially, by the body bore and normally biased away from said primer by said resilient means, and,  
 safety means normally preventing movement of said striker pin toward said primer.

2. The combination according to claim 1 in which said safety means includes:

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a bar extending transversely through said body and intersecting its bore.

3. The combination according to claim 2 in which said handle is transversely divided intermediate its ends to form a removable handle end portion, and, means connecting said removable handle end portion with said handle head portion.

4. The combination according to claim 3 in which said resilient means comprises:

10 a collapsible spring having a central portion surrounding said striker pin adjacent its end portion opposite said primer, said spring having diverging leg portions, said body having radial grooves nesting said spring leg portions.

15 5. The combination according to claim 4 and further including:

means for releasing and removing said bar from said body.

6. The combination according to claim 5 in which said casing is provided with a threaded socket in its end opposite said primer and further including:

an elongated stake having one threaded end engageable with the casing socket.

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